REMARKS/ARGUMENTS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-12 are presently active in this case. The present Amendment amends Claim 1 and adds Claim 12.

The final Office Action of March 21, 2008 finally rejected Claims 1, 4, 10 and 11 under 35 U.S.C. § 103(a), as unpatentable over Rossi et al. (U.S. Patent No. 4,664,969) in view of Bolt et al. (U.S. Patent No. 5,807,798) further in view of Bell et al. (U.S. Patent No. 7,138,084) and the admitted prior art, pages 1-2 (APA). Claims 2-3, and 9 were rejected under 35 U.S.C. § 103(a), as unpatentable over Rossi et al. in view of Bolt et al., the APA, Bell et al. further in view of Mills (U.S. Patent No. 5,143,777). Claim 5 was rejected under 35 U.S.C. § 103(a), as unpatentable over Rossi et al. in view of Bolt et al., Bell et al. and further in view of Tawil et al. (U.S. Patent No. 5,725,955).

Briefly recapitulating, Claim 1 is directed to a method for passivating the contact surface of a refractory container made mainly of mullite, wherein said refractory container is configured to receive molten titanium. The method includes several steps, in particular a step of applying, to the contact surface of the mullite container, a coating comprising 50% to 70% by weight of alumina flour (Al_2O_3) filler and 30% to 50% by weight of binder. ***The binder comprises 50% to 60% by weight of aluminum chloride $AlCl_3$*** dissolved in 40% to 50% by weight of water. Other required steps include drying the coating; and firing the container in an oxidizing atmosphere between 1450°C and 1550°C for at least 20 minutes thereby ***obtaining a coating on the contact surface of the refractory container that is inert to the molten titanium***. The claimed method further includes the step of ***pouring molten titanium on the coating of the mullite container***.

In finally rejecting the claims, the final Office Action stated:

> However it is also pointed out that claim 1 as written merely requires the container be "configured to receive" "molten Ti" or the coating be "inert to said molten Ti". Nowhere in the claim is there a requirement the titanium ever be contacted with the coating, so that the coating merely needs to be capable of being inert to molten Ti. It is the examiner's position that the coating of the PA as presented above would meet that limitation, the rejection overcoming the detriment of the PA cited in the APA.

In response, the present Amendment adds the step of *pouring molten titanium on the coating of the mullite container*. The combination of applied references fails to disclose a method to form a coating on the contact surface of a refractory container that is inert to the molten titanium received in the refractory container, as required by amended Claim 1. The references are not concerned with improving coatings of such containers by avoiding chemical reactions with molten titanium to reduce inclusions of components that can weaken the titanium casting. Therefore, there is no apparent reason to modify the applied prior art in order to obtain Applicant's claimed method. In addition, the fact that the Rossi et al binder is suitable for the purpose of coating a brick substrate does not render obvious the use of its binder for any and all purposes, in particular for coating containers that receive molten titanium, which is known to impose specific constraints and have chemical reactions that are different from these of a brick substrate. Thus, for a person of ordinary skill in the art, there is no reasonable expectation of success that the Rossi et al. binder would function as intended on a container that receives molten titanium.

Further, the final Office Action correctly stated that the pending claims "have greater percentages of $AlCl_3$ in water than the binder of the Prior Art.[1] The final Office Action then stated: "However, applicant's ***specification shows no criticality or unexpected results***, beyond normal process parameters readily ascertainable by one of ordinary skill in the art,

[1] Outstanding Office Action at page 5, lines 16-17.

example optimizing, viscosity, liquid level, etc."[2] Applicant respectfully disagrees because the specification shows the criticality of the claimed percentages of $AlCl_3$ in water. Specifically, the specification shows that the claimed percentages of $AlCl_3$ in water provides the unexpected (and claimed) result of obtaining a coating on the contact surface of the refractory container that is inert to the molten titanium. For example, the specification states:

> Titanium alloys are widely used in aeronautics, but they present the drawback of reacting chemically at elevated temperature with most material used to make the crucibles and the molds containing them, and in particular with silica SiO_2, whether pure or a component of mullite. In the castings, these reactions cause inclusions of undesirable components that are liable to weaken the castings. ***To remedy this situation, it is known to coat the contact surface of the container with a layer of an inert material such as alumina.***
>
> It is known that the silica in the binder reacts chemically with the titanium. ***It should also be observed that a container made exclusively of alumina would be perfectly chemically inert to titanium, but it would be too brittle to withstand the thermal shocks during casting of the molten metal.***
>
> ***A first problem is to provide, on the contact surface of ceramic containers made of material mainly composed of mullite, or even of pure mullite, a coating that is perfectly inert to molten titanium alloys.***
>
> ***To solve this problem***, the invention proposes a method for passivating the contact surface of a refractory container made of mullite. ***Such a method is*** noteworthy in that it comprises the following operations:
>
> a. application to the contact surface of a coating comprising 50% to 70% by weight of alumina flour (Al_2O_3) filler and 30% to 50% of binder, ***this binder itself comprising 50% to 60% of aluminum chloride $AlCl_3$ dissolved in 40% to 50% of water***;
> b. drying;
> c. firing of the container in an oxidizing atmosphere between 1450°C and 1550°C for at least 20 min.
>
> ***The inventors have found that an aluminum chloride*** solution exhibits a binding power comparable to the conventional suspension of colloidal silica. During the oxidizing firing, ***the aluminum in the binder is converted to alumina, crystallizing with the alumina of the filler, while the chlorine thus liberated escapes in gaseous form. This produces an alumina contact layer that is perfectly pure and able to enter into contact with molten***

[2] Outstanding Office Action at page 5, lines 16-19 (emphasis added).

> ***titanium without chemically reacting with it***, thereby solving the first problem.
>
> The binder consequently constitutes 30% to 50% of the total weight of the slurry. This binder is a solution of aluminum chloride $AlCl_3$ dissolved in water, the aluminum chloride $AlCl_3$ constituting 50% to 60% of the total weight of the binder and the water consequently constituting 40% to 50% of the total weight of the binder.

Thus, applicant's specification clearly shows the criticality and unexpected results of the claimed method. The specification establishes that a person of ordinary skill in the art faced "a first problem" with Prior Art methods: to provide, on the contact surface of ceramic mullite containers, a coating that is *perfectly inert to molten titanium alloys*. The specification further establishes that one of ordinary skill in the art did not have a satisfying solution to this problem because, while a container of alumina is inert to titanium, it is also too brittle to withstand the thermal shocks during casting of molten metal. Applicant's specification further establishes that the claimed method is the solution to "solve this problem," and that this solution includes the claimed step of applying "to the contact surface of a coating comprising 50% to 70% by weight of alumina flour (Al_2O_3) filler and 30% to 50% of binder, this *binder itself comprising 50% to 60% of aluminum chloride* $AlCl_3$ dissolved in 40% to 50% of water." None of the applied prior art teaches or suggests the benefit and the expectation of obtaining a coating that is inert to molten titanium alloys and thus the advantage of using a binder with Al_2O_3 in a mullite container that receives molten material.

Therefore, Applicant respectfully requests reconsideration of the rejection, at least because Applicant's specification shows criticality and unexpected results for the claimed percentages of $AlCl_3$ in water.

The Advisory Action of June 25, 2008 states that the support to demonstrate unexpected results / criticality lacks sufficient scientific evidence and cites MPEP 716. This

section of the MPEP refers to Affidavits or Declarations Traversing Rejections and Rule 132. This section and Rule 132, however, apply when the evidence of non-obviousness is "not otherwise provided." In the present case, the above remarks are not merely attorney's arguments, but are ***statements cited from the specification, which constitute evidence*** already provided in the record, and filed with the specification along with a Declaration from the inventor who declared:

> "I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above."
>
> ***
>
> "I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56."
>
> ***
>
> "I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon."

Thus, the record already includes evidence of non-obviousness and there is no need to submit the same evidence with a Rule 132 declaration.

The Advisory Action further states that "[w]hen a primary reference is silent as to a certain detail, one of ordinary skill would be motivated to consult a secondary reference which satisfies the deficiencies of the primary reference." The Advisory Action, however, fails to cite any support for such a broad assertion. Applicant respectfully disagrees with this assertion because obviousness is determined on a case by case basis. Here, as acknowledged by the Advisory Action, the primary reference (the '969 patent) "was silent as to whether the specific silica containing refractory is mullite." The primary reference does not suggest to one of ordinary skill in the art that its method has some "deficiency." On the contrary, the

'969 patent teaches that its method is satisfactory in that it produces a "strong bond" that does not require mechanical anchors, and that can withstand "exteemly high temperatures" and "repeat differential thermal expansion and contraction."[3] Thus, one of ordinary skill in the art would not be motivated to consult a secondary reference to satisfy any "deficiencies" of the '969 patent. Applicant respectfully submits that there is no evidence that one of ordinary skill in the art would have found it obvious to use an aluminum chloride binder instead of silica on a mullite container. This step was taught by Applicant, and is not found in the prior art, nor within the knowledge and creativity of ordinary skilled artisans. The APA reports that it is known that a coating with silica is detrimental on a mullite container. The '969 patent teaches a coating with aluminum chloride but nothing about mullite containers, nor any benefit of using aluminum chloride in coatings applied on mullite containers. The '798 patent does not teach anything about aluminum chloride in binders for coatings applied to mullite containers, nor any benefit of using aluminum chloride in coatings for mullite containers. Thus, the only evidence of record is that, at the time of applicant's invention, one of ordinary skill in the art used silica in binders for coatings applied to mullite containers and that there was a problem associated with this method. However, nothing in the prior art suggests that one of ordinary skill in the art would have turned to binders with aluminum chloride in order to solve the problem that exists with respect to mullite containers that receive molten titanium. Even assuming that one of ordinary skill in the art would have somehow turned to the '969 patent to solve the problem, the end result would have been a process that is not the same as the one claimed because, as acknowledged by the Office Action, the percentages of $AlCl_3$ in the claimed binder are greater than those of the '969 patent.

[3] The '969 patent at column 2, lines 59-60; and column 3, lines 15-21.

Consequently, in view of the above remarks, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-12 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the below listed telephone number.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
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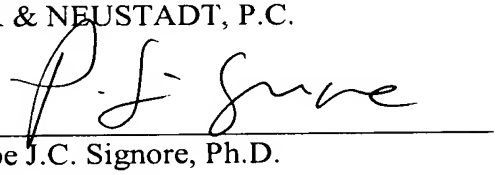

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